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dependent upon the degree of accuracy * realized in the observed velocities.

It is a pleasure to record that I have been assisted most efficiently in these investigations, since August, 1897, by Mr. W. H. WRIGHT, assistant astronomer.

LICK OBSERVATORY,
UNIVERSITY OF CALIFORNIA, December, 1900.

PLANETARY PHENOMENA FOR MAY AND JUNE, 1901.

BY MALCOLM McNEILL.

MAY.

There will be a very close approximation to a lunar eclipse at Full Moon on May 3d, the Moon passing within 1' of the Earth's shadow. At the succeeding New Moon, May 17th, there will be a total eclipse of the Sun. The line of totality lies in the southern hemisphere, and passes almost wholly through the ocean, but crosses the islands of Sumatra, Borneo, and New Guinea. The eclipse is remarkable on account of the great duration of totality, nearly six and one half minutes in some places, a duration four times as great as any available duration for the eclipse of May 28, 1900.

Mercury is a morning star at the beginning of the month, but passes superior conjunction on May 14th, and becomes an evening star. It moves rapidly away from the Sun, eastward and northward. Toward the end of the month it becomes a comparatively easy object in the evening twilight, not setting until an hour and a half after sunset.

Venus is now an evening star, having passed superior conjunction with the Sun on April 30th, but remains quite close to the Sun throughout the month. At the end of the month it sets only a little more than half an hour after sunset, and will be very hard to see.

Mars is still waning, increasing its distance from us 24,000,000 of miles during the month, and diminishing in brightness about

* In the later observations of the *best stars* with the Mills spectrograph, an extreme range of two kilometers would afford strong suspicion of variable velocity; and the greater portion of a smaller range due to unavoidable errors would arise not from errors in the spectrograms, I believe, but from changes in the observer's personal habits of measuring the plates.

one half. It moves about 10° east and 5° south during the month through the constellation *Leo*. On May 4th it passes between *Regulus* and η *Leonis* in the handle of the Sickle, not quite 2° north of the first. On May 31st it occupies a position about 3° south of the position it held on February 12th.

Jupiter and *Saturn* are now coming nearer to being evening stars, both rising before 10 P.M. toward the close of the month. Both are still in the constellation *Sagittarius*, and both are retrograding, *Jupiter* a little faster, on account of its lesser distance from us. At the close of the month their distance apart is about 4° , half a degree greater than it was at the beginning of the month.

Uranus rises earlier by about two hours, and has nearly come to opposition. It is retrograding in the southern extension of *Ophiuchus*.

Neptune sets shortly after sunset, and is getting into poor position for observation.

JUNE.

The Sun reaches the solstice and summer begins on June 21st, 7 P.M., Pacific time.

June affords the best time of the present year for observations of *Mercury*. The planet is an evening star throughout the month, and until the very last days sets more than an hour and one half after sunset. It comes to greatest east elongation on June 15th. This elongation is nearly 25° , more than 6° greater than the preceding greatest east elongation in February.

Mercury is in conjunction with *Venus*, about 4° south, on the evening of June 30th.

Venus is an evening star, rather farther from the Sun than it was in May. After the middle of the month it sets more than an hour after sunset, and will be an easy object to see.

Mars is to be found farther to the west in the evenings, and sets shortly after 11 P.M. by the end of the month. It still keeps up its rapid recession from the Earth, losing more than 20,000,000 miles and more than one third in brightness during the month. It is in the constellation *Leo*, and moves 13° east and 6° south, nearly to *Virgo*. On June 12th it reaches the point at which it began its retrograde motion in January, except that it is now about 3° south of its former position.

Jupiter and *Saturn* are still near together, although separating slightly. By the end of the month they rise about midnight.

They are still in *Sagittarius*, both moving eastward, *Jupiter* 4° and *Saturn* 2° , during the month, and at the end of the month *Jupiter* is about 6° west of *Saturn*. After their retrograde motion ceases, *Jupiter* will again approach *Saturn*, and they will come into conjunction with each other late in November. *Jupiter* is in opposition with the Sun, and consequently above the horizon during the entire time the Sun is below, on June 30th. The opposition of *Saturn* comes five days later.

Uranus is in opposition on June 5th. It retrogrades a little more than 1° in *Ophiuchus*, and at the close of the month is about $30'$ north of the sixth-magnitude star α *Ophiuchi*.

Neptune is in conjunction with the Sun on June 20th, and changes from evening to morning star.

MAY-JUNE, 1901.

PHASES OF THE MOON, P. S. T.

Full Moon	. . .	May 3,	10 ^h 19 ^m	A. M.
Last Quarter	. . .	May 11,	6 38	
New Moon	. . .	May 17,	9 38	P. M.
First Quarter	. . .	May 24,	9 40	
Full Moon	. . .	June 2,	1 53	A. M.
Last Quarter	. . .	June 9,	2 0	P. M.
New Moon	. . .	June 16,	5 33	A. M.
First Quarter	. . .	June 23,	12 59	P. M.

THE SUN.

1901.	R. A.	Declination.	Rises.	Transits.	Sets.
May 1,	2 ^h 32 ^m	+ 14° 57'	5 ^h 5 ^m A. M.	11 ^h 57 ^m A. M.	6 ^h 49 ^m P. M.
11,	3 11	+ 17 46	4 54	11 56	6 58
21,	3 50	+ 20 6	4 45	11 56	7 7
31,	4 31	+ 21 51	4 39	11 58	7 17
June 10,	5 12	+ 22 59	4 36	11 59	7 22
20,	5 53	+ 23 26	4 36	12 1 P. M.	7 26
30,	6 35	+ 23 13	4 39	12 3	7 27

MERCURY.

May 1,	1 39	+ 8 18	4 36 A. M.	11 4 A. M.	5 32 P. M.
11,	2 55	+ 16 19	4 44	11 41	6 38
21,	4 24	+ 22 54	5 7	12 30 P. M.	7 53
31,	5 49	+ 25 34	5 41	1 16	8 51
June 10,	6 55	+ 24 35	6 13	1 43	9 13
20,	7 37	+ 21 41	6 27	1 45	9 3
30,	7 50	+ 18 40	6 17	1 18	8 19

VENUS.

1901.	R. A.	Declination.	Rises.	Transits.	Sets.
May 1,	2 33	+ 14 12	5 10 A.M.	11 59 A. M.	6 48 P. M.
11,	3 22	+ 18 3	5 5	12 8 P. M.	7 11
21,	4 13	+ 21 6	5 4	12 19	7 34
31,	5 5	+ 23 11	5 8	12 32	7 56
June 10,	5 59	+ 24 9	5 18	12 46	8 14
20,	6 52	+ 23 57	5 32	1 0	8 28
30,	7 45	+ 22 34	5 53	1 14	8 35

MARS.

May 1,	10 0	+ 14 28	12 34 P.M.	7 24 P.M.	2 14 A.M.
11,	10 11	+ 13 7	12 11	6 56	1 41
21,	10 25	+ 11 32	11 50 A.M.	6 30	1 10
31,	10 40	+ 9 45	11 33	6 6	12 39
June 10,	10 57	+ 7 48	11 18	5 44	12 10
20,	11 15	+ 5 42	11 4	5 23	11 42 P. M.
30,	11 34	+ 3 28	10 51	5 2	11 13

JUPITER.

May 1,	18 57	— 22 39	11 44 P.M.	4 23 A.M.	9 2 A.M.
June 1,	18 50	— 22 51	9 37	2 15	6 53
July 1,	18 35	— 23 10	7 26	12 2	4 38

SATURN.

May 1,	19 11	— 21 55	11 56 P.M.	4 37 A.M.	9 18 A.M.
June 1,	19 7	— 22 3	9 50	2 31	7 12
July 1,	18 58	— 22 18	7 45	12 25	5 5

URANUS.

May 1,	17 0	— 22 45	9 48 P.M.	2 26 A.M.	7 4 A.M.
June 1,	16 55	— 22 38	7 42	12 20	4 58
July 1,	16 50	— 22 30	5 35	10 14 P.M.	2 53

NEPTUNE.

May 1,	5 48	+ 22 15	7 53 A.M.	3 13 P.M.	10 33 P.M.
June 1,	5 53	+ 22 17	5 55	1 15	8 35
July 1,	5 57	+ 22 18	3 52	11 22 A.M.	6 42

ECLIPSES OF *JUPITER'S* SATELLITES, P. S. T.

(Off left-hand limb as seen in an inverting telescope.)

I, D, May	4,	1 ^h 46 ^m	A.M.	I, D, June	3,	3 ^h 50 ^m	A.M.
II, D,	6,	9 54	P.M.	I, D,	4,	10 19	P.M.
III, D,	10,	9 51		II, D,	7,	9 27	
III, R,	11,	12 37	A.M.	I, D,	12,	12 13	A.M.
I, D,	11,	3 40		I, D,	13,	6 41	P.M.
I, D,	12,	10 9	P.M.	II, D,	15,	12 2	A.M.
II, D,	14,	12 28	A.M.	I, D,	19,	2 7	
III, D,	18,	1 49		I, D,	20,	8 36	P.M.
III, R,	18,	4 36		II, D,	22,	2 37	A.M.
I, D,	20,	12 2		III, D,	22,	9 42	P.M.
II, D,	21,	3 2		I, D,	26,	4 1	A.M.
I, D,	27,	1 56		I, D,	27,	10 30	P.M.
I, D,	28,	8 25	P.M.	III, R,	30,	4 35	A.M.
II, D,	31,	6 53					

(FORTIETH) AWARD OF THE DONOHUE
COMET-MEDAL.

The Comet-Medal of the Astronomical Society of the Pacific has been awarded to M. MICHEL GIACOBINI, of the Nice Observatory, for his discovery of an unexpected comet on December 20, 1900.

The Committee on the Comet-Medal,

W. W. CAMPBELL,
W. M. PIERSON,
CHAS. BURCKHALTER.
